Facilities Quarterly

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY◆FACILITIES DEPARTMENT NEWSLETTER

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1998

FY99: A YEAR FOR INFRASTRUCTURE PROJECTS

The new fiscal year brings two major infrastructure projects to Berkeley Lab: the Building 77 Rehabilitation and the Blackberry Switching Station Replacement. Both are funded by the DOE Office of Energy Research (OER) Multiprogram Energy Laboratory-Facilities Support (MEL-FS) program. The MEL-FS program has been vital for infrastructure development at Berkeley Lab.

Several inches of shims (white box) raise a bridge crane rail assembly to compensate for Building 77 settlement.

Building 77 Rehabilitation

With its cavernous interior, massive bridge cranes and heavy machinery, Building 77 suggests power more than precision. Yet, many of the world's most sophisticated scientific instruments have been fabricated here, including the ALS synchrotron and beamlines; detectors for Fermilab, Brookhaven, and CERN; the Gammasphere; and, currently in production, the Silicon Vertex Tracker for the B-Factory.

Home of the Engineering Division's mechanical shops, the 69,000 sq ft (6410 sq m) high-bay structure is one of the largest buildings on the Hill. Within, it has everything necessary to transform steel, aluminum, or other stock metal into any conceivable shape. As building manager Dick Johnson says, "If you can plot it in Cartesian coordinates, we can make it."

Johnson emphasizes that Building 77 is not a production facility but a "prototype" or "first

continued on page 2

SMALL PROJECTS CLOSE OUT FY98

The end of the fiscal year brought with it a surge of small projects supported by supplemental funds out of Berkeley Lab's operating budget. Because more supplemental funds were available this year, the Small Projects Group has been especially busy, completing about 90 projects.

Some projects have been more noticeable than others. The appearances of Buildings 51 and 71 (west face) have been improved by new coats of paint. In the Cafeteria, the new coffee bar and Employee Buying Service area is open for business. Drivers have probably noticed a number of small paving projects going on around the hill as we prepare for winter. Other preparations for the coming rains include storm drain and retaining wall repairs.

Although less visible, the new Actinide Center in Building 70A will provide a significant new research capability, with upgrades of existing labs as well as new utilities, lab benches, and offices. In Building 50A, conference rooms 5132 and 4133 have been upgraded with new video equipment, improved lighting, and more user-friendly controls. Downstairs, new shielding in room 1127 will protect laboratory equipment from EMR generated by electrical switchgear in the basement.

INSIDE

INFRASTRUCTURE

continued from page 1

article" shop. Engineering staff work closely with scientists on an informal basis to produce unique, complex shapes with a high degree of precision. "That," says Johnson, "is where we excel."

In contrast to its precision engineering mission, the building structure itself is "out of tolerance," having experienced enough differential settlement over the years to throw bridge crane rails out of alignment by nearly a foot. The rails are attached to building columns, and run parallel along opposite walls. The columns along one wall have settled, with the attached rail. The rehab project will prevent further settlement by underpinning the foundation with drilled caissons. The project will also restore the lateral force resisting system and realign the bridge crane rails to their original specifications.

In addition to the structural work, Building 77 will receive needed mechanical, electrical, and architectural system upgrades. A new heating, ventilating, and air conditioning (HVAC) system will replace a 30-year-old system that can't provide the required temperature control, while new insulation will minimize energy use. In the machine shop areas, new sound-absorbing baffles will keep sound levels within OSHA limits.

The new HVAC system will provide effective temperature, air quality, and humidity controls in the Main Machine Shop and other areas that presently don't have independent temperature and air quality control.

The Main Machine Shop takes up about a third of Building 77. Here, rows of numerically-controlled machines provide the core of Engineering's precision fabrication capability. Mounted on one such sturdy automaton—a horizontal milling machine—is the work piece that will become the center of the Silicon Vertex Tracker, the detector for SLAC's BaBar experiment. At tolerances of 0.0001 in. (0.0025 mm), all the metal that will be removed, over several weeks of milling, to create the final product could fit easily in the palm of one's hand.

This level of precision requires a constant room temperature to avoid errors stemming from thermal expansion. Since the existing HVAC can't achieve this, machinists keep a thermometer next to the milling machine and "regulate" the room temperature by making fine adjustments to various building doors. With the new HVAC system, this skill will become obsolete.

Other enhancements will include electrical system upgrades to support the new mechanical systems and architectural improvements needed to meet current building code and Americans with Disabilities Act (ADA) requirements.

Dick Johnson points out that precision engineering has become far

continued on page 6

FROM THE FACILITIES MANAGER...

Despite the rains, we had a successful FY98. The Lab's operating condition is better than ever, its appearance is better than anytime in the past decade, and the maintenance backlog is at its lowest level in recent memory. I used to say that a good day in Facilities was one when no major complaints were received, but in the last year we've been getting many more compliments than complaints.

We continue to lose co-workers to retirement. This past quarter Plant Maintenance shift supervisors Bob Baird and Bob Sommers made that decision. Tom Hill steps up to run all of the day shift in our continuing effort to streamline and reduce management staff. Chuck Axthelm is going on to bigger and better things as Business Manager for EH&S. We are fortunate to have Emmy Randol joining the department as the new controller.

This next year will see some major changes. The Production Sequencing Facility in Walnut Creek starts operations. As the Human Genome operations move, Berkeley Lab will no longer need the Dymo building and will end that lease. Some Life Sciences researchers will move from 70A into 62, allowing consolidation in that building. The departments in Promenade and Hinks will consolidate in Berkeley Towers. Procurement will join them, releasing Building 69 for Ops use and, in turn, office space in other buildings for expanding research divisions. We will have two line item projects going this year. Cable pulls will start for the Blackberry Canyon Substation, and design will start for the renovation of Building 77.

WOW continues to be effective. Our accident rate has decreased about 30% over the past two years. An excellent start; but, we have a ways to go. My apologies for forgetting two of our coaches, Oscar Lopez and Dave Cooper, when awarding OPAs; we'll make it up in the next cycle.

Bob Camper

Work SMART...
Work SAFELY...
If it is not safe, STOP the work.

FACILITIES DEPARTMENT

Facilities provides Berkeley Lab with a full range of architectural and engineering, construction, and maintenance services for new facilities and for modification and support of existing facilities.

Architectural and engineering services include facility planning, programming, design, engineering, project management, and construction management. Maintenance and construction functions include custodial, gardening, and lighting services; operation, service, and repair or replacement of equipment and utility systems; and construction of modifications, alterations, and additions to buildings, equipment, facilities, and utilities. Additional services include bus and fleet management, mail distribution, stores distribution, and property disposal.

Ongoing Facilities activities include renewal and upgrade of site utility systems and building equipment; preparation of environmental planning studies; in-house energy management; space planning; and assurance of Laboratory compliance with appropriate facilities-related regulations and with University and DOE policies and procedures.

The Work Request Center expedites facility-related work requests, answers questions, and provides support for facility-related needs.

FOCUS ON SERVICE: THE SIGN SHOP

The last year has been busy for Vic Haskett of Technical Services' Sign Shop. A year ago the shop took over production of the Lab's new interior signage, saving the Lab about 60 percent on cost and achieving turnarounds of days rather than months—an important advantage, given the Lab's ever-changing room assignments and population.

Key to this success has been the acquisition of a plastic engraving machine and a vinyl plotter, which work off a PC much like regular printers. The engraver produces the raised numbers and braille for the ADA-compliant room placards and directional signage now installed in buildings throughout the Lab.

Working from templates provided by a design consultant, the Sign Shop produces commercial-quality signs at a reasonable cost. Says Haskett, "We can compete easily with anything on the outside."

The vinyl plotter produces an adhesive image, which can be applied to metal or plastic and is highly durable. Loaded with a variety of fonts, as well as the Berkeley Lab identity font and logo, the plotter produces the Lab's road signs, the new "bull's eye" building numbers now visible on many buildings, signs for laboratories and equipment, temporary construction signage, and conference signage. Conference customers have been especially pleased with the low cost, high quality, and quick turnarounds. According to Haskett, one conference customer was surprised to find that the Sign Shop's good-looking signs were less expensive than the hand-stenciled ones provided by a vendor, and the turnaround time was far shorter as well.

If you find yourself waiting for a sign, give the Sign Shop a try by contacting the Work Request Center.

COMPLIMENTS

Engineering's Bill Ghiorso writes, "I would like to express my appreciation for the outstanding job Steve Bravo has been doing cleaning up the Building 58 shop…Steve has managed to keep up with all the mess we make on a daily basis and maintain the floors and machine trays in a spotless condition. This really makes our messy shop a better place to work and helps us to keep better organized…Steve's thoroughness and commitment are appreciated by everyone here."

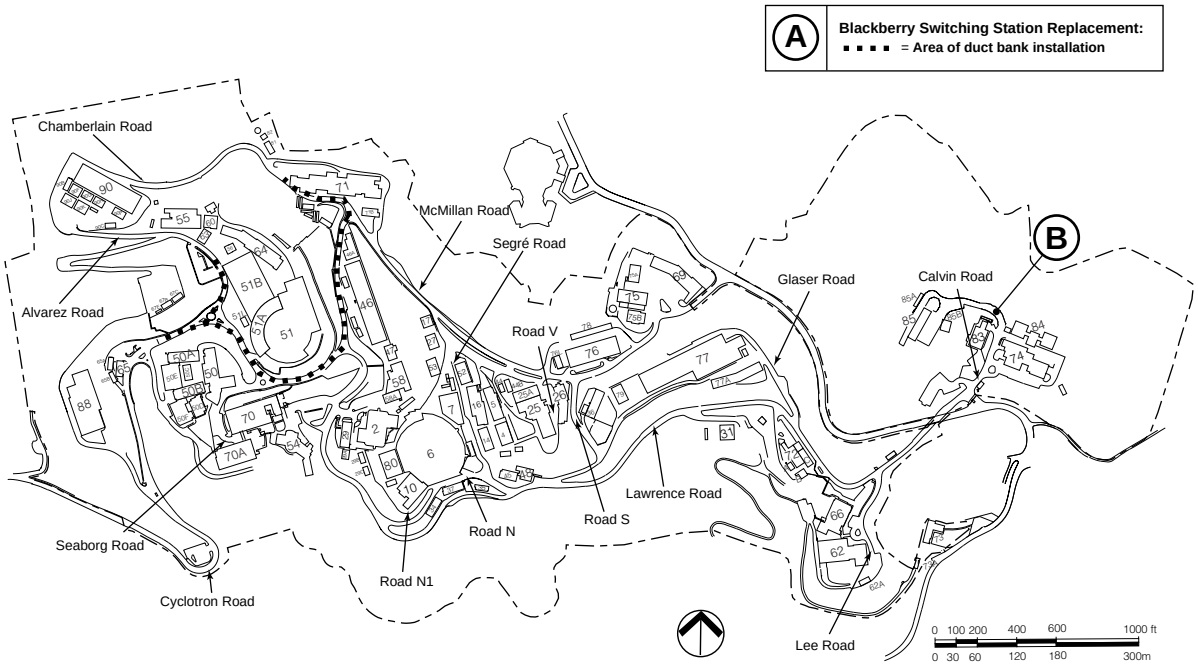
WORK REQUEST CENTER

Telephone	6274
Fax	7805
E-Mail	LBL-Facilities@lbl.gov
Mailstop	76-222

WRC welcomes questions or comments about Facilities Quarterly.

CONSTRUCTION AND YOU

Current construction projects affecting parking, or vehicular or pedestrian circulation



Project Contacts. The name in parentheses after each project is the Project Manager (PM) or other person who is responsible for project oversight: coordinating all phases from design through construction; controlling cost, scope and schedule; and ensuring client satisfaction. This person will be happy to answer any questions about the project.

Blackberry Switching Station—Duct Bank

(A)

OCT	NOV	DEC

Duct bank construction along Cyclotron and Alvarez roads will require localized lane closures and traffic control. Parking along McMillan Road will continue to be used by the contractor. Construction will be completed in the middle of November, at which time traffic controls will end and parking along McMillan Road will become available again.
(Chuck Taberski, x6076)

Calvin Crib Wall Replacement

OCT	NOV	DEC

(B)

Calvin Road to and from Building 85 will be barricaded, with single-lane traffic control from mid-October to mid-November while work proceeds on a storm-damaged crib wall.
(Bill Wu, x5216)

"CAUTION—CONSTRUCTION AREA"

Construction barricades and warnings are there for your protection. Under no circumstances should you cross a construction barricade, or disobey posted warnings or directions. Contact the Project Manager for escorted access to construction areas.

ON THE DRAWING BOARD

projects in study or conceptual design

Bldg 74: Rehabilitation of Building Systems

This project will upgrade Building 74 mechanical and electrical systems, provide seismic upgrade of the structure, and bring architectural features up to code. As part of the project, the Building 84 utility center will be expanded to accommodate Building 74 utilities, including relocated mechanical equipment and new electrical switchgear. This project is under consideration for FY2000 funding. (Richard Stanton, x6221)

Sitewide Water Distribution Upgrade, Phase 1

Much of Berkeley Lab's fresh water supply system has been in place for over 30 years. This project will replace about 0.9 mile (1.5 km) of cast iron pipe and upgrade the remaining 5 miles (8 km) of pipe with corrosion protection, new valves and pressure-reducing stations, improvements to an existing water storage tank, and a new water storage tank in the East Canyon area. Facilities will prepare an updated conceptual design report for FY2001 funding consideration.
(Charles Allen, x6438)

Bldg 62: Upgrade of Building Systems

With 55,265 sq ft (5135 sq m) of space, Building 62 is one of Berkeley Lab's largest multipurpose laboratory facilities. This project will expand wet chemistry capacity with new fume hoods, centralized exhaust, and an acid waste neutralization system. Other improvements will include modifications to the HVAC system, variable air volume (VAV) controls in the laboratories, an expanded low-conductivity water (LCW) system, electrical upgrades, and a new standby generator. The project will also make structural and architectural improvements. The conceptual design report for this project will be prepared this year for FY2001 funding consideration. (Richard Stanton, x6221)

IN PROGRESS

funded projects

Bldg 50C: Air Conditioning

Construction starts in October for installation of new air handling units (AHUs) on the Building 50C roof. This will provide air conditioning for the building.
(Charles Allen, x6438)

Bldg 51: First Floor Space Conversion—North

The Superconducting Magnet Group will occupy approximately 5500 sq ft (510 sq m) in the north end of Building 51. This project is providing space conversion, additional electrical power, lighting, fire protection, piping for mechanical systems, and a bridge crane. The project also includes demolition of existing outdated and abandoned equipment and relocation of other equipment. (Lonny Simonian, x6088)

Bldg 70: Supply Air Fan Installation

This project will provide a new supply air fan for Building 70. (Charles Allen, x6438)

Bldg 70A: Actinide Laboratory Upgrade

This project includes installation of a High Efficiency Particulate (HEPA) filtration system on fume hoods belonging to the Actinide Group.
(Lonny Simonian, x6088)

JGI Production Sequencing Facility

Located in existing buildings in Walnut Creek, California, this 5,800 square-meter (62,600 SF) facility will house the automated DNA sequencing operations of the Joint Genome Institute (JGI). Building 944 is nearing completion, and the JGI Pilot Test Team is expected to move in by the end of October.
(Kirk Haley, x5973)

INFRASTRUCTURE

continued from page 2

more exacting since Building 77 opened over 30 years ago. "If somebody wants you to work with a hammer and chisel, you can do that anywhere," says Johnson, "But if they ask you for a couple of tenths, you need the support."

The Building 77 Rehabilitation project will provide the support.

Blackberry Switching Station

Moving at an accelerated pace, the Blackberry Switching Station Replacement project is more than six months ahead of schedule. Completion of work on underground electrical ducts and manholes, which has involved extensive trenching on some roads, should be complete by November 15.

Over the next five months, workers will pull about 6000 feet (2000 m) of new 15-kV cable through the ductbanks beneath McMillan, Cyclotron, Alvarez, and Chamberlain roads. Pulling the cable between the cable vaults is no easy task. The cable is around an inch (2.5 cm) thick, as rigid as solid metal, and weighs about 3 lb per foot (4.5 kg per meter). In some cases the cable vaults are over 300 feet (90 m) apart, so that's 900 lb (400 kg) that must be hauled through the conduit.

The cable will deliver 12.47-kV power along dual circuits from Grizzly Substation (the Lab's connection to the PG&E grid) to the new Blackberry Switching Station, soon to be constructed behind the Bevatron on the site of its predecessor. Dual 15-kV circuits will connect Blackberry Switching Station to both existing and new secondary substations throughout the Blackberry Canyon service area, which includes such key research facilities as NERSC, the 88-Inch Cyclotron, and the Center for Functional Imaging.

The new cable will replace feeders that are in some cases over 40 years old. These lines have broken on several occasions, throwing buildings into darkness and disrupting experiments. With no backup power, service restoration can be a long time coming. The absence of backup power has also made it hard to schedule routine 12-kV system maintenance, which is often deferred. The new duct banks' dual cables provide backup that will eliminate outages and simplify system maintenance.

The Blackberry Switching Station project also includes construction of two new substations, modernization of others, and removal of the antiquated Big C Substation. New switchgear will enhance system reliability, ease maintenance, and increase the safety of the system for Facilities electricians.

The Blackberry Switching Station Replacement is the final phase in Berkeley Lab's 12-kV electrical distribution upgrades, which began in 1987 with the modernization of Grizzly Substation and included construction of the ALS Substation, Original Labsite Substation, and East Canyon Substation.

See Construction and You on page 4 for project impacts during this quarter.

MAINTENANCE: A DIGITAL VIEW

The Berkeley Lab site has over one million square feet (93,000 sq m) of pavement and an equal expanse of roofs. Knowing when and where to maintain these and other elements of site infrastructure—such as gutters, building ladders, guard rails, retaining walls, exterior building walls, perimeter fencing, and even slopes—is quite different from maintaining equipment. Knowing, for example, what "part" of a road is most likely to fail implies a detailed knowledge of the entire road. Comparing competing maintenance priorities is also a challenge. As Technical Services manager John Bowerman explains, "The key is to accurately identify where the problems are so that we fix the right ones."

Newly-affordable digital cameras allow Technical Services to track such assets more effectively. Digital images are used to identify assets and document their condition, and they are easily distributed via the Internet or other digital means to decision makers at the Lab and at DOE. The before / after digital images shown here are from a graphical database of retaining walls created and maintained by Technical Services' Wesley Steele.

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